Part 1 - Pending Claims in Clean Form

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1. (Original) A varactor comprising:

a diode junction;

a depletion region adjacent to the diode junction; and

a doped region including the depletion region and having a nonuniform dopant concentration profile that increases with increasing depth of the doped region from the diode junction;

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and wherein the nonuniform dopant concentration profile causes the varactor to have an approximately linear capacitance/voltage response characteristic.

2. (Original) A varactor as defined in claim 1 wherein:

the doped region includes a peak dopant concentration region outside the depletion region; and

the peak dopant concentration region forms a conductive path to and from the varactor.

3. (Amended) A varactor as defined in claim 1 wherein:

the nonuniform dopant concentration profile is defined by an equation N=Bxexp(m), where N is the dopant concentration, x is the depth of the doped region, B is a concentration constant and m is an exponent that determines the degree of curvature of the dopant profile.

4. (Original) A varactor as defined in claim 3 wherein m is greater than zero.

5. (Original) A varactor as defined in claim 3 wherein m is about 3.

6. (Original) A varactor as defined in claim 3 wherein:

B is in a range from about 1.0E13/cm3 to about 1.0E19/cm3; and

m is greater than zero.

7. (Original) A varactor as defined in claim 6 wherein B is about 1.0E16/cm3.

8. (Amended) A varactor for use in an integrated circuit comprising:

a semiconductor substrate;

a first side of the varactor formed in the semiconductor substrate and being doped with a first type of dopant in a retrograde dopant profile;

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a second side of the varactor formed in the semiconductor substrate adjacent the first side and being doped with a second type of dopant; and

a portion of the first side adjacent the second side forming a depletion region within the first side upon applying a voltage bias between the first side and second side, the dopant profile in the first side creating a capacitance between the first side and the second side that is linearly variable in response to differing magnitudes of the applied voltage bias.

9. (Original) A varactor as defined in claim 8 wherein:

the retrograde profile of the first type of dopant in the first side includes an increasing dopant concentration with increasing depth from the second side to a peak concentration region; and

the peak concentration region functions as a conductive path to and from the varactor.

10. (Original) A varactor as defined in claim 8 wherein:

the first side is a generally horizontal bottom side; and

the second side is a top side generally parallel to the bottom side.

Part 2 – Pending Claims with Markings and Indications to Show Changes

1. (Original) A varactor comprising:

a diode junction;

a depletion region adjacent to the diode junction; and

a doped region including the depletion region and having a nonuniform dopant concentration profile that increases with increasing depth of the doped region from the diode junction;

and wherein the nonuniform dopant concentration profile causes the varactor to have an approximately linear capacitance/voltage response characteristic.

2. (Original) A varactor as defined in claim 1 wherein:

the doped region includes a peak dopant concentration region outside the depletion region; and

the peak dopant concentration region forms a conductive path to and from the varactor.

3. (Amended) A varactor as defined in claim 1 wherein:

the nonuniform dopant concentration profile is defined by an equation ~~N=Bxm~~ N=Bxexp(m), where N is the dopant concentration, x is the depth of the doped region, B is a concentration constant and m is an exponent that determines the degree of curvature of the dopant profile.

4. (Original) A varactor as defined in claim 3 wherein m is greater than zero.

5. (Original) A varactor as defined in claim 3 wherein m is about 3.

6. (Original) A varactor as defined in claim 3 wherein:

B is in a range from about 1.0E13/cm3 to about 1.0E19/cm3; and

m is greater than zero.

7. (Original) A varactor as defined in claim 6 wherein B is about 1.0E16/cm3.

8. (Amended) A varactor for use in an integrated circuit comprising:

a semiconductor substrate;

a first side of the varactor formed in the semiconductor substrate and being doped with a first type of dopant in a retrograde dopant profile;

a second side of the varactor formed in the semiconductor substrate adjacent the first side and being doped with a second type of dopant; and

a ~~depletion region formed within~~ portion of the first side adjacent the second side forming a depletion region within the first side upon applying a voltage bias between the first side and second side, the ~~voltage bias also~~ dopant profile in the first side creating ~~causing~~ a capacitance between the first side and the second side that is linearly variable ~~with~~ in response to differing magnitudes of the applied voltage bias.

9. (Original) A varactor as defined in claim 8 wherein:

the retrograde profile of the first type of dopant in the first side includes an increasing dopant concentration with increasing depth from the second side to a peak concentration region; and

the peak concentration region functions as a conductive path to and from the varactor.

10. (Original) A varactor as defined in claim 8 wherein:

the first side is a generally horizontal bottom side; and

the second side is a top side generally parallel to the bottom side.